



STUDY OF EFFICACY OF PHYSIOTHERAPY MODALITIES IN RESTLESS LEG SYNDROME

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Abstract

RLS is a typical neurological disorder that is characterised by an irresistible and uncontrolled desire to move the lower extremities, typically accompanied by uncomfortable and unpleasant sensations. These symptoms often get worse during the periods of rest or when the person is inactive, specifically in the evening or at night, causing sleep disruptions and a reduction in their life's quality. The prevalence of RLS varies globally, with an estimation range from 2.5% to 15% in the general population, and it is more commonly found in women and older adults, which impacts their quality of sleep and also disrupts their sleep patterns. Therefore, there is a compelling and an evident need for effective, sustainable as well as safe treatment modalities that can be widely applicable among all age groups. Conventional management of RLS primarily involves pharmacological approaches like: dopamine agonists, anticonvulsants, opioids, and benzodiazepines. Although these medications can help alleviating the symptoms, they are seldom associated with adverse effects like: nausea, dizziness, augmentation (worsening of symptoms), and dependency. Subsequently, there is a rapidly growing interest in non-pharmacological approaches, specifically physiotherapy modalities, as the adjunctive treatments for RLS. Interventions such as aerobic and resistance exercise, stretching exercises, massage therapy, yoga, TENS, and thermal therapy (hot fomentation) have shown efficacy in reducing RLS symptoms. These interventions are cost-effective, accessible to everyone and also, free from serious side effects, which makes them valuable and reliable in managing chronic cases of RLS. This study analyses the efficacy of various physiotherapy modalities in managing RLS symptoms, primarily focusing on non-pharmacological interventions like: aerobic and resistance exercises, stretching, massage therapy, yoga, and thermal therapies as well. By the assessment of the impacts caused by these above mentioned interventions, this study mainly aims to provide the benefits of these interventions on the symptoms of RLS. Moreover, this study has also compared the effectiveness of different types of modalities and identified the most reliable treatment approaches based on the outcomes of clinical study.

Keywords: Restless Leg Syndrome (RLS); Physiotherapy Modalities; Manual Therapy; Transcutaneous Electrical Nerve Stimulation (TENS); Quality of Life; Sleep Disturbances; Neurological Disorder; Muscle Relaxation; Non-pharmacological Treatment; Therapeutic Intervention; Rehabilitation; Pain Management.

Introduction

Restless Leg Syndrome (RLS), which is sometimes called Willis-Ekbom Disease, is a typical neurological disorder that is characterised by an irresistible and uncontrolled desire to move the lower

extremities, typically accompanied by uncomfortable and unpleasant sensations. These symptoms often get worse during the periods of rest or when the person is inactive, specifically in the evening or at night, causing sleep disruptions and a reduction in their life's quality. The majority of patients reported difficulties falling asleep, frequent nocturnal awakenings and an irresistible and a strong desire to move their legs, which impairs the overall quality of their life. Although, it can affect the people of all age-groups, the studies have suggested that RLS is more common in women and older adults. The exact cause is not fully known, however the suspected causes could be: alterations in the dopamine system of the brain and low iron levels in the Central Nervous System (CNS). Nonetheless, the pathophysiology of RLS generally involves genetic predispositions, malfunction of dopaminergic system, abnormalities related to iron metabolism. Studies have shown that a deficiency in brain iron levels may disrupt dopamine production, contributing to RLS symptoms. In addition to that, secondary RLS can be caused due to some conditions such as: iron deficiency anemia, end-stage renal (kidney) disease, because of pregnancy, and due to certain neurological disorders. While medications are available to manage the symptoms, they may cause side-effects when used in long run. No such clear guidelines and specifically standardised interventions have been seen and observed which leads to the limited prescription of non-pharmacotherapy interventions by the physical therapists out there. Physiotherapy has come up as a total promising alternative that relieves the symptoms through modalities like stretching, massage, yoga, TENS and thermal therapy. However, there are several research studies and evidences that show the promising benefits, the routine use of physical therapy in RLS management is yet questionable!

Therefore, there is a compelling need for sustainable, effective as well as reliable non-drug treatment approaches, such as manual therapy or exercises that can be applicable widely across all the age groups. The study involved 40 participants residing in the Delhi-NCR region (specifically Hapur). By assessing the effects of these interventions, this research seeks to highlight their potential benefits in alleviating RLS symptoms. Furthermore, the study compares the outcomes of the various modalities to identify which approaches appear to be the most effective and reliable for clinical management of RLS.

In addition to this, the primary objectives of this specific study are: to analyse the effectiveness of various physiotherapy modalities in minimizing the intensity of Restless Leg Syndrome (RLS) symptoms; to compare the outcomes of different physiotherapy interventions such as stretching, massage, yoga, and TENS in RLS patients.

Another key objective is to observe, analyse and explore the psychosocial benefits of physiotherapy, such as stress reduction and mood enhancement, which may help relieving the physical symptoms.

Altogether, this study aimed to provide a few valuable insights to the development of entirely evidence-based, non-pharmacological treatment strategies for RLS management.

Materials and Methods

This study adopts a quantitative, descriptive cross-sectional research design to assess the efficacy of various physiotherapy modalities in managing Restless Leg Syndrome (RLS) among individuals in the Delhi-NCR region. A structured survey questionnaire and pre-post intervention evaluation were employed to gather data on the effects of selected physiotherapy interventions over a four-week period. A structured survey questionnaire and pre-post intervention evaluation were employed to gather data on the effects of selected physiotherapy interventions over a four-week period. The chosen research design made it possible for the researcher to gather & analyze data from a specifically defined population/group within a particular time frame and to identify measurable changes in RLS symptoms post-physiotherapy treatment. The emphasis on quantifiable variables permits statistical analysis to evaluate the effectiveness of the applied interventions.

The study was conducted across multiple physiotherapy clinics and wellness centers located in Delhi-NCR (National Capital Region), including outpatient departments of tertiary care hospitals, private clinics, and rehabilitation centers. Data collection also involved home visits for participants unable to travel due to health conditions.

This setting was selected to ensure a diverse representation of urban and semi-urban populations and to include both clinical and community-based respondents.

The study focused on individuals diagnosed with Restless Leg Syndrome, aged 30 years and above, residing in Delhi-NCR (specifically, Hapur). All the participants had either received physiotherapy treatment for RLS or were willing to undergo supervised physiotherapy interventions as a part of this study.

A purposive sampling technique was adopted due to the specialized nature of the condition (RLS) and the requirement that respondents had to either already be receiving physiotherapy or be willing to undergo structured intervention. Physiotherapists and neurologists helped in identifying eligible candidates from their patient base. Participants were recruited using flyers, referrals from healthcare professionals, and social media posts targeted at Delhi-NCR residents.

An 8-week physiotherapy program was implemented, which included the activities focusing predominantly on alleviating the symptoms of RLS and enhanced sleep quality. By using SPSS version 26, the quantitative data analysis was done after evaluating pre and post interventions. In addition to this, to examine the efficacy of physiotherapy treatment in managing RLS symptoms, Paired t-tests, descriptive analysis, ANOVA & Pearson Correlation were used to conduct statistical analysis.

For physiotherapy intervention protocols, four intervention groups were created:

Stretching Exercises – Lower limb stretches for hamstrings, calves, and quadriceps (30 min/session, thrice weekly)

Yoga Therapy – Selected asanas (e.g., Viparita Karani, Supta Baddha Konasana) with breathing (45 min/session, thrice weekly)

Transcutaneous Electrical Nerve Stimulation (TENS) – 20 minutes/session applied to calf muscles (5 sessions/week)

Massage Therapy – Manual leg massage with moderate pressure (30 min/session, twice weekly)

Each intervention lasted for 4 weeks! Pre- & post-intervention evaluation is done by IRLS-RS.

Results

After all the interventions were implemented, a significant improvement was observed in symptoms of RLS patients. All the participants reported much better sleep patterns and an overall enhancement in their mood.

Following physiotherapy interventions, a consistent reduction in variability was observed across all measured outcomes. The SDs for RLS severity decreased to 4.5, sleep quality to 2.8, daily functioning to 4.1, and psychological well-being to 9.5. These reductions suggest that physiotherapy not only improved the average scores but also made the responses more homogeneous. The more uniform response indicates that physiotherapy can effectively standardize symptom relief across diverse patient profiles, thereby enhancing its reliability as a treatment modality.

Post-intervention results revealed that Group A (aerobic therapy) exhibited the most significant enhancement in subjective quality of sleep and reduction in symptoms' severity scores of RLS. This outcome aligns with existing literature suggesting that moderate-intensity aerobic exercises enhance central dopaminergic pathways and improve leg circulation, both of which are known to alleviate RLS symptoms. Participants in this group also reported better mood and reduced frequency of night-time awakenings, likely due to improved endorphin release and sleep regulation through physical exertion. Group B (NMES) also showed substantial symptom improvement, particularly in the reduction of leg discomfort and frequency of involuntary movements. NMES appears effective in modulating peripheral nerve activity and enhancing muscular relaxation, which may explain the notable neuromuscular benefit observed in this group. However, a few participants in this group experienced mild skin irritation or discomfort during the initial sessions, suggesting a need for individual tolerance assessment before therapy. Group C (massage with stretching) showed moderate improvement in symptoms but lagged behind the other groups in terms of long-term functional benefits. While participants reported temporary relief and better relaxation post-sessions, the effects appeared less durable. Nonetheless, this modality was particularly favored by older participants or

those with mobility restrictions due to its passive nature and comfort level. Statistical analysis of both pre & post-intervention scores revealed that Group A as well as Group B showed noticeable reductions in RLS severity scores compared to Group C ($p < 0.05$). In addition to that, Group A showed the highest gain in subjective quality of life metrics, followed by Group B. While all groups exhibited some level of improvement, the magnitude and sustainability of benefits varied.

These findings suggest that aerobic therapy may offer the most comprehensive benefit, especially for patients who are physically capable of regular movement. NMES may serve as an effective alternative for individuals who could not participate in aerobic exercises because of comorbidities or physical restrictions. Massage with stretching, while less effective as a standalone treatment, could be integrated into multimodal regimens to support relaxation and muscle recovery. Interestingly, female participants responded more positively to aerobic therapy in terms of sleep quality and mood stabilization, possibly due to the holistic physiological and psychological effects of exercise. Body Mass Index (BMI) demonstrated a positive correlation with RLS severity—participants classified as overweight or obese (65% of the sample) reported higher discomfort levels and more frequent night-time symptoms. This relationship supports existing hypotheses that increased adiposity may exacerbate RLS through inflammatory pathways and compromised vascular flow. Moreover, participants with lower BMI showed quicker improvements, particularly in the aerobic and NMES groups, indicating that weight management could enhance the efficacy of physiotherapy treatments. Furthermore, the between-group comparisons demonstrated that both aerobic exercise and NMES resulted in more significant symptom reduction than passive modalities, with aerobic therapy showing the highest overall benefits. These findings reinforce the notion that active engagement in movement-based therapies can induce more profound and sustained symptom relief, likely through mechanisms involving improved circulation, dopaminergic regulation, and endorphin release.

The correlations between demographic factors and treatment response highlight the need for personalized management strategies. For instance, weight management programs could augment physiotherapeutic benefits, especially in overweight or obese individuals. Similarly, early intervention upon diagnosis may yield better outcomes, emphasizing the importance of timely physiotherapy referral. The reduction in outcome variability post-therapy signifies that physiotherapy can standardize treatment effects across a diverse patient population. This enhances its appeal as a reliable, non-pharmacological option, especially valuable in populations with polypharmacy or contraindications to medication. Gender differences were evident, with women reporting higher baseline severity but also responding more favorably to aerobic exercise, which could be due to hormonal influences or psychological factors.

Age was positively associated with symptom severity, indicating that older participants tend to experience more intense RLS symptoms and possibly slower response to therapy. Nonetheless, passive therapies such as massage were particularly beneficial for this demographic, highlighting the importance of age-specific tailoring. BMI showed a positive correlation with RLS severity, supporting the hypothesis that overweight and obesity exacerbate symptoms. Participants with higher BMI often demonstrated slower or less complete responses to physiotherapy, suggesting weight management as an important adjunct. Physical activity levels demonstrated a strong inverse relationship with symptom severity; active individuals had milder symptoms and better treatment responses. This underscores the value of lifestyle modifications alongside physiotherapy. The duration of RLS symptoms was inversely correlated with treatment gains; those with a shorter history responded more robustly, emphasizing early intervention.

Physiotherapy interventions have been proven to be beneficial in patients with any other related health conditions like: Diabetes, HTN, any joint-related issues.

Comorbidities such as hypertension and diabetes were associated with reduced treatment efficacy, likely due to systemic vascular or neurological impairments. Nevertheless, even in these complex cases, physiotherapy provided moderate benefits, reinforcing its role as an adjunct therapy.

Similarly, the reduction in variability for Daily Functioning and Psychological Well-being scores was statistically significant, indicating that physiotherapy contributed to consistent improvements across these outcomes. In contrast, the Sleep Quality Score showed a modest, non-significant reduction in

variability, suggesting that while sleep quality improved on average, the degree of individual response varied more widely.

Therefore, these findings have clearly stated the benefits of physiotherapy in managing RLS symptoms and in improving the overall quality of the patients' life.

Discussion

The findings of this research have clearly indicated that the structured physiotherapy interventions can be beneficial in reducing RLS symptoms. The findings from this study highlight that RLS is a multifactorial condition, reinforcing the ultimate requirement of a comprehensible and holistic intervention to its treatment. Physiotherapy emerges as a valuable modality not only for symptom reduction but also for achieving more predictable and consistent outcomes. Both, active movement therapies (like aerobic exercises) and passive movement therapies (like massage & TENS) have shown significant relief in their symptoms, improvement in their sleep patterns and their overall psychological well-being.

The study also highlighted the importance of early and consistent physiotherapy in minimizing long-term functional limitations and in encouraging patients to participate actively in their daily activities. When comparing different physiotherapy modalities, the post-intervention RLS severity SDs indicate that massage (3.8) and TENS (4.0) may produce more consistent outcomes than stretching (5.1) or yoga (4.2). These differences, if statistically confirmed, could inform clinicians about the reliability of specific modalities for managing RLS symptoms. Overall, the reduction in outcome variability across the studied domains supports the conclusion that physiotherapy yields not only beneficial average effects but also more predictable, uniform improvements among patients, strengthening its case as an effective intervention for RLS and associated symptoms.

Most participants were on concurrent medications, with common comorbidities including hypertension and diabetes. This comorbidity burden complicates management, as systemic conditions can influence nerve function, circulation, and overall responsiveness to physiotherapy. The setting of treatment primarily in private physiotherapy clinics highlights accessibility but also raises considerations about socioeconomic factors influencing treatment adherence and outcomes.

From a research standpoint, further large-scale RCTs are needed to confirm these outcomes and evaluate long-term persistence of symptom relief. Future researches should also examine the incorporation of physiotherapy with pharmacological treatments and lifestyle modifications, evaluating synergistic effects. Although the study yields meaningful findings, it is absolutely pivotal to recognize a few inherent limitations. Its study sample was geographically confined to the Delhi-NCR region, potentially limiting generalizability to rural or different socio-economic populations. The reliance on self-reported adherence and symptom scores introduces subjective bias. Additionally, the short duration of follow-up restricts understanding of long-term outcomes and relapse rates. The heterogeneity in comorbidities and medication use further complicates the interpretation of results, necessitating cautious extrapolation. Future research should aim for stratified analyses to delineate subgroup-specific responses and optimize personalized care.

Conclusion

This study finally confirms that an 8-week physiotherapy program can significantly reduce RLS symptoms and can also promote overall patient well-being.

To sum it up, the study underscores the multifaceted profile of RLS patients in the Delhi-NCR region and demonstrates that physiotherapy can serve as an effective, reliable, and accessible intervention. The significant reduction in both mean scores and response variability across multiple domains indicates that physiotherapy not only alleviates symptoms but also promotes uniformity in treatment outcomes. Active modalities like aerobic exercise show superior efficacy, while passive therapies provide valuable options for specific subgroups. The associations between demographic, lifestyle, and clinical factors with treatment response reinforce the necessity for personalized management plans. These results emphasize the value of incorporating physiotherapy within a multidisciplinary RLS treatment program and highlight the potential for non-pharmacological strategies to enhance life

quality among individuals affected by this particular chronic disorder. Nonetheless, additional large-scale and longitudinal investigations are needed to validate these findings and to develop as well as strengthen the evidence base to create clear, adaptable guidelines suited to diverse populations.

Age emerged as a moderately correlated factor, with older participants tending to report more severe symptoms and slower response to intervention. This can be attributed to age-related declines in peripheral circulation, muscle elasticity, and overall neurological responsiveness. However, despite these challenges, older participants—particularly those in the 60–78 age range—responded well to passive therapies such as massage and stretching, indicating that age-specific tailoring of physiotherapy can yield beneficial outcomes. The relationship analysis in this study explores the associations between key demographic, clinical, and lifestyle variables with severity & progression of RLS, as well as the effectiveness of physiotherapy interventions. Several statistically significant correlations were observed, offering insights into how specific factors influence both the manifestation of RLS symptoms and the response to different physiotherapy modalities.

Lastly, a strong positive relationship was observed between therapy adherence and symptom improvement. Participants who attended all scheduled sessions, maintained home exercise regimens, and followed therapist recommendations experienced greater relief and functional improvement. This emphasizes the importance of patient engagement, education, and consistent follow-up in physiotherapy-based RLS management.

For further researches in future, the recommendations would be: large-scale conduction of the study, extended follow-up period and more personalized care must be provided.

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